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UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF COOPERATIVE EXTENSION WORK
THE BUREAU OF PLANT INDUSTRY COOPERATING

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NUMBER 7

The Extension Pathologist

"TO PROMOTE ECONOMIC CROP PRODUCTION,
IMPROVE THE QUALITY OF THE PRODUCTS, AND
REDUCE WASTAGE IN STORAGE, TRANSIT, AND AT THE MARKET"

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UNITED STATES DEPARTMENT OF COMMERCE
BUREAU OF COMMERCE
WASHINGTON, D. C.

REPORT OF THE SECRETARY OF COMMERCE
FOR THE YEAR 1902

The Extension Problem

OF THE
UNITED STATES DEPARTMENT OF COMMERCE
BUREAU OF COMMERCE
WASHINGTON, D. C.

THE SECRETARY OF COMMERCE
WASHINGTON, D. C.

THE EXTENSION PATHOLOGIST

Volume 3

Number 7

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THE UNIVERSITY OF CHICAGO

CHICAGO, ILLINOIS

1900

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MARKET INSPECTION AND EXTENSION OPPORTUNITIES
RESULTING FROM THE MARKET CONTACT

In September we had a paper by Dr. D. H. Rose on Market Pathology in the United States. In this paper Dr. Rose summarized the work which has been done along this line during the last 25 years. Since 1918, there has been much interest in this type of research for, with the growth of the Food Products Inspection Service of the Bureau of Agricultural Economics, there has been a steady increase in the demand for more knowledge concerning the things which prevent successful shipment of fruits and vegetables. F. C. M.

FOOD PRODUCTS INSPECTION SERVICE

By Robert Bier, Supervising Inspector,
Food Products Inspection Service, Bureau of
Agricultural Economics.

The market inspection service was started in the fall of 1917, at which time the Secretary of Agriculture was authorized by Congress to investigate and certify to shippers as to the condition of certain perishable farm products when received in important central markets. During the first fiscal year the service was instituted in 36 of the most important markets and approximately 6,000 carloads were inspected.

It is interesting to note that even in the first year of operation the certificates issued were used as a basis for settlement of claims of shippers and receivers. Again the service had a beneficial effect in speeding up the movement of perishables by making it possible to release cars more promptly and prevent a large number of rejections and diversions. Receivers, shippers, transportation companies, and others interested in distribution gave it cordial indorsement.

Cooperation with Food Administration.

The next year Congress amended the authority, making the service not only available to shippers but to receiving railroads and other financially interested parties. Amendments also provided that a fee should be charged for each inspection. About 15,000 inspections were made. Thirty important markets had inspection offices, while a total of 164 markets were designated as inspection points. Close cooperation was maintained with the U.S. Food Administration, The Federal, State, and local administrations used the inspection certificates continually, since they found them a necessary basis for adjusting a large number of claims between shippers and receivers.

THE HISTORY OF THE
REPUBLIC OF THE UNITED STATES

The history of the Republic of the United States is a story of the growth of a great nation from a small colony of English settlers. The first settlers came to the New World in 1492, and the first English colony was founded in 1607. The colonies grew and developed, and in 1776 they declared their independence from Great Britain. The new nation was born, and it has since grown into a great power.

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Attitude of business factors.

The presence of competent inspectors in the leading markets has been welcomed by the produce trade, the members of which realize that their influence can not be fully measured by the number of cars which are actually inspected. The fact that such a service is available deters unscrupulous dealers and shippers from attempting sharp practices.

Shipping point inspection.

Congress, in 1922, again broadened the authority of inspection of perishable food products by the U. S. Department of Agriculture by providing for Federal certification at shipping point.

Producers through this service are able to know whether or not they have fulfilled the terms of their contracts before their products are shipped. It is especially valuable as a basis for F. O. B. selling. Again when combined with official certificates at both ends of the line the interested parties can fix responsibility for deterioration in transit.

At the very outset there was an obvious need for an agency which would assist in harmonizing the varying policies of the States and in bringing about a mutual understanding between the shipping point and terminal services. The Federal department therefore cooperated closely with the State departments and in a few cases furnished supervisors to act in an advisory capacity. With the broadened authority and, in spite of the fact that it was not accompanied by any increase in appropriations, the situation was improved. Cooperative agreements were made in 26 States providing for a joint State and Federal service.

Under the provision of the agreement the Federal department may participate in the supervision of the work but without duplicating or supplanting existing State machinery.

Number of inspections made.

Both terminal and shipping point inspection services have developed rapidly. The table given below covers inspections made in terminal markets since the fiscal year 1918-19.

The purpose of this report is to provide a summary of the results of the study conducted by the research team. The study was designed to investigate the effects of the proposed intervention on the target population. The results of the study are presented in the following sections.

The study was conducted in a controlled environment, and the results were analyzed using statistical methods. The findings of the study are discussed in detail in the following sections.

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Number of Inspections Made in Terminal Markets, 1918-19 to 1923-24

Market	1918-19	1919-20	1920-21	1921-22	1922-23	1923-24
Atlanta.....	98	464	385	436	563	694
Baltimore.....	274	833	691	864	542	421
Boston.....	1,106	1,399	1,028	1,049	1,154	1,649
Buffalo.....	286	535	598	609	567	839
Chicago.....	2,302	4,115	2,671	4,120	3,257	2,967
Cincinnati.....	356	880	729	695	678	519
Cleveland.....	784	1,122	1,296	1,324	1,266	1,178
Columbus.....	70	297	187	253	499	665
Denver.....	184	212	(1)	16	103	171
Detroit.....	694	781	561	1,061	1,222	1,109
Erie.....	(1)	(1)	(1)	(1)	16	(1)
Fort Worth.....	221	445	75	122	192	142
Harrisburg.....	(1)	(1)	(1)	27	46	25
Houston.....	242	359	339	99	235	147
Indianapolis.....	358	474	510	456	450	333
Kansas City.....	727	1,347	865	835	791	980
Los Angeles.....	39	5	36	26	30	25
Louisville.....	(1)	(1)	9	80	(1)	(1)
Memphis.....	276	422	321	452	441	363
Milwaukee.....	56	360	248	480	864	447
Minneapolis.....	500	577	558	1,035	770	629
New Haven.....	(1)	(1)	(1)	(1)	25	514
New Orleans.....	294	654	744	684	949	1,292
New York.....	2,016	2,036	2,717	4,262	4,764	7,249
Norfolk.....	(1)	(1)	12	146	243	454
Omaha.....	419	593	288	471	316	379
Philadelphia.....	429	1,740	3,351	5,196	3,358	1,057
Pittsburgh.....	1,236	3,894	4,412	4,375	2,227	1,981
Portland.....	(1)	(1)	(1)	(1)	(1)	379
Saint Louis.....	932	1,329	786	1,357	1,879	1,952
Salt Lake City.....	(1)	(1)	(1)	(1)	(1)	13
San Antonio.....	(1)	(1)	(1)	(1)	(1)	55
San Francisco.....	80	42	5	5	6	10
Washington.....	158	496	448	536	558	486
Wichita.....	(1)	(1)	(1)	(1)	52	(1)
Wilkes Barre.....	(1)	(1)	(1)	136	156	159
Other markets.....	356	77	7	(1)	(1)	(1)
TOTAL.....	14,493	25,488	23,877	31,207	28,169	29,283

(1) No inspector stationed here for this period.

The following table shows the number of cooperative shipping point inspections made in the States listed during the fiscal years 1923, 1924, and 1925.

State	1923	1924	1925
Alabama	----	251	---
Arkansas	----	88	528
California	17,778	46,424	37,517
Colorado	24,815	10,341	14,086
Delaware	----	50	108
Florida	162	8,370	10,710
Georgia	45	1,392	7,510
Idaho	13,338	18,403	11,366
Illinois	----	208	269
Louisiana	----	266	273
Maine	384	---	105
Maryland	----	---	549
Massachusetts	67	7	---
Mississippi	----	1,709	336
Missouri	36	---	584
Montana	444	305	115
Nebraska	----	4,830	2,835
Nevada	----	34	23
New Jersey	1,499	719	669
New York	905	1,475	1,685
North Carolina	----	566	2,707
North Dakota	432	---	---
Ohio	78	169	662
Oregon	387	4,442	3,686
Pennsylvania	----	274	203
South Carolina	1,091	1,712	1,082
South Dakota	308	368	188
Tennessee	51	232	134
Texas	----	6,349	8,289
Utah	651	1,642	1,518
Virginia	4	526	2,099
Washington	8,917	15,360	14,980
West Virginia	39	232	317
Wisconsin	1,035	2,305	1,460
Total	72,466	129,049	
(1)			
Arizona	----	300	4
Indiana	----	551	631
Iowa	----	---	229
Kansas	----	855	1,420
Missouri	----	204	---
GRAND TOTAL	72,466	130,959	131,087

(1) Straight Federal inspection at shipping point.

Reinspections.

Of the total 130,959 cars inspected at shipping points in 1924, only 239 reinspections were made at receiving markets. One hundred and ten of these were reversed. During the second year of the service one car out of 1,190 was reversed, while during the previous year one out of 2,131. The increase in number of reinspections made and cars reversed was due largely to a greater familiarity on the part of the trade with methods of using the service. With established grades and with the methods of the inspection service the total number of reinspections has been small considering the total volume of the work performed.

All reinspections are called to the attention of the supervisor of the district in which the original inspection was made and careful investigation of the work of the inspector follows. In a number of instances inspectors have been discharged as a result of such investigations.

Aids introduction of grades.

The shipping point inspection service has demonstrated that more progress can be made in obtaining the adoption of recognized standards at shipping point through inspection in a single season than can be accomplished in a number of years by any other means. Marked changes are brought about in grading practices. Receivers are increasingly demanding inspected products.

Cooperative organizations have benefited by the inspection service because of assistance rendered them in dealing fairly with their members without the embarrassment usually experienced by officers of the organizations in obtaining deliveries of uniform quality from their members.

Fees.

Fees are charged both in receiving markets and at shipping points. In the receiving markets a fee of \$4 is charged. In addition, the traveling expenses of the inspectors must be paid if services are rendered in a designated market some distance from the permanent office of the inspector assigned to make the inspection. Upon reinspections where grade is sustained, a fee of \$12 is assessed; if reversed, no charge is made.

At shipping point the fee varies. The intention of both States and Federal authorities is to perform the service at cost, and the fee is therefore fixed at a price which will cover cost of operation. Ordinarily this has not been over \$5 a car.

Inspections for grade.

All grade inspections, whether in markets or at shipping point, are based upon samples taken from representative parts of the load, the size of the sample and number of samples varying with the commodity and the number

of lots that are being loaded in the car. The inspector notes factors covering condition, quality, and grade. In addition, the inspector makes a thorough inspection of the equipment of car into which the product is being loaded. In the case of a refrigerator car, this takes in the plugs, ice in bunkers, fitting of doors, soundness of roof and floor, the working of the drip pipes, the racks on the floor, and any point that would have an important bearing upon efficient refrigeration. The condition and method of loading is noted.

Certificates accepted in courts.

With all these facts in hand, the inspector prepares a certificate that is issued to the applicant. This certificate is accepted as prima facie evidence in all Federal courts; and where States have so enacted and inspection is carried on cooperatively with the Federal Government, the certificate is accepted in both Federal and State courts.

EXTENSION OPPORTUNITIES GROWING OUT OF INSPECTION WORK

By F. C. Meier, Extension Plant Pathologist, U. S.
Department of Agriculture.

When the inspection service began to function it was often found that a high percentage of many commodities on arrival at the market was either seriously blemished, or decayed and unfit for food. As the members of the trade so conveniently put it, the products were affected by "specks and rots." Such phraseology was hardly definite enough to satisfy the Bureau of Markets. It was evident that if a true picture of the car contents were to be obtained, inspectors would have to be instructed so as to enable them to accurately name the type of blemish or decay found. Consequently, the Bureau of Plant Industry was asked to survey the job and by the summer of 1918, under a cooperative agreement between the two bureaus, two schools in plant pathology were being operated for beginning inspectors, one at Chicago, and the other at New York. In addition to contributing to the training of the inspectors at these points, the pathologists in charge gave advisory service to the inspectors and conducted survey and educational programs among trade and railroad circles. At the present time there is close cooperation between the two bureaus. Pathologists from the Offices of Fruit-Disease Investigations and Cotton and Truck Crop Disease Investigations spend a part of their time each year with the training class. When the inspector is not familiar with a disease found during his work, specimens are sent to Washington by mail, and the material is identified by the pathologists of the Bureau of Plant Industry. Quite often the report is sent out by leased wire and reaches the inspector in time to enable him to include the diagnosis in his certificate.

The first part of the paper is devoted to a general discussion of the problem. It is shown that the problem is of great importance in the theory of the structure of the universe. The second part is devoted to a detailed study of the problem. It is shown that the problem is of great importance in the theory of the structure of the universe.

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The training of inspectors to recognize and name specific plant diseases found in cars at terminal markets was a real step in progress toward a more general application of those plant-disease control measures known, and the seeking for knowledge concerning the unknown. Produce men were no longer setting down a loss on the books as due to "specks and rots." They began to talk about phoma, anthracnose and brown-rot.

Dealers and railroads began to inquire into the cause of these troubles and means for their prevention.

Of course, it often happens that research has not uncovered the information necessary to give relief. There have been many instances where, as Doctor Rose has pointed out, research followed closely on the heels of market inspection. It sometimes happens, however, that the necessary information is available, has perhaps been available for many years. When this is the case an effort is made to spread the good news. Business is taking an increased interest in extending knowledge on control of plant diseases.

And here, after a rather long introduction, I come to the real object of these notes, namely, to call attention to the opportunities for extension work which are available through contacts with the market. Where our knowledge concerning a control measure is in the extendable stage, can market inspection help us in our State work? Experience has shown that it can.

The inspection service, working on all markets becomes an observer of fruits and vegetables from every State and from almost all sections in the State. If one wishes to look at it so, the inspector records the accomplishment of the grower, whether or not he actually grows a quality crop which is successfully brought to the consumer in a marketable condition. If the grower fails, the reason is usually given. Degree of maturity, shape, size, color, and disease are among the items frequently made note of.

In order that this material might be used in studies designed to bring out methods of preventing future losses by disease, an arrangement was made several years ago to provide for the copying of statements relating to disease from the inspection certificates when they arrive in Washington from the different markets for filing. This material is typed on 5 x 8 inch cards. (See page 63.) In each case the car number and name of shipper are given so that from a study of these one knows the condition of a given car shipped by a specific individual or firm on a given date. The card tells the type of car, method of loading, and length of time on the road. In other words, we have in these cards a real opportunity to study the performance of a crop after it leaves our State.

A complete file of these cards is maintained in the room occupied by the extension pathologist, Room 211, West Wing, U. S. Department of Agriculture. This is kept for the use of Federal and State research and extension workers.

Tomatoes, in 6 basket carriers. Phoma Rot. Florida.
Market: Memphis (A78173) Smith 4/2/25
From: _____, Petersburg, Fla. To: _____, Memphis, Tenn.
Car: FGE 21545 Rfg. Temp.: Top load at door 62°; bottom 62°.
Hatches open, plugs out, bunkers empty; 5 in. floor racks.
Loaded full length car 4 high, 7 wide, stripped; good order.
Pack: Tight.
Size: Uniform.
Of stock free from decay, 70% turning, 25% ripe and firm; 5% ripe and soft.
DECAY: 8% stock in all crates shows Phoma Rot, ranging from initial stage
to complete decay.
25% stock shows blemishes; bad scars and worm holes.

Grapefruit, in boxes Stem End Rot, Florida.
Market: Indianapolis, (1820) Strauss 10-16-22
From: _____, Orlando, Fla. To: _____, Indianapolis, Ind.
Car: FGE 26038 Rfg. Temp.: Bottom at door 58°; top 58°.
Hatches open, plugs out.
Loaded entire length of car 6 wide, 2 high on end; stripped.
Pack: Fairly tight.
Size: Regular.
Stock firm, heavy and juicy. Good color.
DECAY: From 5% in some boxes to 30% in others, averaging between 15 and 20%.
Decay is Stem End Rot advanced stage.
Pract. no blemishes other than those usually packed in these grades.

For several years the Plant-Disease Survey has mailed the copies of these cards which cover crops from a given State to their collaborator in that State. In some instances these are being put to excellent use by the extension pathologists in those States. For example, in Florida it is found that the information on these cards is most useful in planning the work. A summary of the mass information on performance of the crops shipped from the State gives figures which are very useful under the statement "Facts Determining the Undertaking of the Project." When presented to the community in mass form, information of this sort is a good means of at least arousing interest. When such a report is presented to the individual grower who harvested the crop, loaded it into the car and made the shipment, it becomes a powerful means of arousing both desire for control information and action.

Since this card service was initiated, the point of origin inspection service has come to be a factor of importance. Study of the certificates issued at the point of origin are often enlightening. In these we have a good check on condition of the crop at the time of harvesting. Information contained in these certificates serves to give the extension pathologists much more definite information as to how the crop is turning out than if their information depended on casual inspections made when going through the territory. These certificates as in the case of those issued at point of origin may serve to call attention to shortcomings of the disease program or, on the other hand, may serve as evidence of successful work. Close study of the work done by the Food Products Inspection Service will enable the specialist to stimulate joint attack of all concerned on the many problems which become evident when attention is focused on the details of marketing perishables.

NEWS NOTES

Virginia. Word has just been received from County Agent J. R. Lintner at Leesburg, Va., to the effect that seed wheat treating will be practically completed in his county by October 17. Loudoun County farmers have shown an unusual degree of interest in copper carbonate. Mr. Godkin, extension pathologist, was in this office October 1, and told of work under way in several counties with the hot-water treatment of wheat as well as copper carbonate.

An interesting feature of the work at Leesburg, Va., is the degree of cooperation received from the millers. In two instances commercial treating machines have been installed and farmers may have their seed treated at the mill.

Maryland. Dr. Jehle visited in the office on October 10. The farmers in Maryland are also calling for help in the matter of bunt control. Method demonstrations on control of stinking smut have been held at meetings in different localities in Washington, Caroline, Frederick, and Montgomery counties. It is expected that demonstrations will be held at

The first part of the paper is devoted to a discussion of the
 various methods which have been proposed for the determination of
 the rate of reaction between a radical and a molecule. The
 most common of these is the method of initial rates, in which
 the initial concentration of the radical is varied and the
 initial rate of reaction is measured. This method is simple
 and direct, but it is subject to a number of errors, and it
 is often difficult to obtain accurate results. Another method
 which has been proposed is the method of steady-state
 concentrations, in which the concentration of the radical is
 maintained at a constant value by the addition of a
 suitable reagent. This method is more accurate than the
 method of initial rates, but it is also more complicated,
 and it is often difficult to obtain accurate results. A
 third method which has been proposed is the method of
 continuous flow, in which the radical and the molecule are
 mixed in a flow tube, and the rate of reaction is
 measured by the change in concentration of the radical as
 it passes through the tube. This method is very accurate,
 but it is also very complicated, and it is often difficult
 to obtain accurate results.

In this paper, we have used the method of initial rates
 to determine the rate of reaction between a radical and a
 molecule. The results show that the rate of reaction is
 proportional to the concentration of the radical, and that
 it is independent of the concentration of the molecule. This
 is in agreement with the theory, which predicts that the
 rate of reaction should be proportional to the concentration
 of the radical, and that it should be independent of the
 concentration of the molecule.

The results also show that the rate of reaction is
 independent of the temperature. This is in agreement with
 the theory, which predicts that the rate of reaction should
 be independent of the temperature.

The results of this experiment are in good agreement with
 the theory, and they show that the method of initial rates
 is a reliable method for the determination of the rate of
 reaction between a radical and a molecule.

Dorchester, Talbot, and Worcester Counties. Homemade apparatus has been used at these meetings. This work is being carried on by Dr. Jehle in cooperation with Mr. F. C. Oldenburg, agronomy specialist.

Field inspections of fall-grown seed potatoes were finished this week. Bin inspections will be made within a short time. In Maryland a bin inspection is made at a stated time, and a second is made at the time when the seed is shipped.

Dr. Jehle reports an interesting development in the case of tomatoes grown from plants shipped in from the South. Fields in which such plants were grown have been found to contain nematodes in abundance. A case of severe loss was noted at Cambridge.

Washington, D. C. Mr. F. C. Meier will leave Washington, October 11, for a trip to the Middle West. His itinerary will be as follows:

Morgantown, W. Va., October 12-13.
Columbus, Ohio, October 14-15.
Lafayette, Ind., October 16, 17, 18.
Urbana, Ill., October 19-20.

ANNOUNCEMENTS

Extension Conference in Kansas City

In making up the program for the midwinter meetings of the American Phytopathological Society, Tuesday afternoon, December 29, has been reserved for a round-table conference on extension work. At this time opportunity will be given members of the society to discuss ways of teaching farmers to adopt control practices.

This session will offer an unusual opportunity for meeting the extension pathologists who are conducting work in the different States.

Lincoln Conference

The following notice received from Dr. G. L. Peltier concerning plans for a conference for study of potato degeneration diseases to be held at Lincoln, Neb., December 28, 1925, will be of particular interest to those who plan to attend the Kansas City meetings.

"Anyone who has had anything to do with potato degeneration diseases realizes the difficulty in recognizing the 20 or more kinds of degeneration diseases and their combinations from published descriptions, particularly on different varieties. It is still more difficult for those who have to apply, set, and interpret the standards for potato certification.

the first of these is the fact that the
 system is not a simple one, and that
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The eleventh of these is the fact that
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The twelfth of these is the fact that
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In our circular letter sent to persons interested in potato degeneration diseases the object of the conference was stated as follows:

- (1) To obtain a knowledge of the symptoms of each of the degeneration diseases and combinations of these diseases, on different varieties.
- (2) To arrive at a standard method of describing symptoms of degeneration diseases.
- (3) To avoid the duplication of names for the same disease.
- (4) To acquaint all workers with degeneration diseases which are already described by other workers, but do not occur in their own localities.
- (5) A round-table discussion of the above points in relation to potato-seed production.

It is planned to have men working with degeneration diseases of potatoes send in tubers of different varieties from plants known to be infected with the various diseases to Lincoln, where they will be grown under controlled environmental conditions in the greenhouse, which will favor the expression of the characteristic symptoms of each disease.

On the day of the conference each investigator who has sent diseased material will discuss and compare the symptoms of the diseases as they appear in the greenhouse with those which he has observed under field conditions. With the plants before him and through discussion, a clearer conception of the degeneration diseases of potatoes should be obtained.

For the extension pathologist and those interested in better seed production and certification this conference should offer a good opportunity to see most of the degeneration diseases so far described in this country. With the investigator at hand to lead the discussion, a better understanding of the symptoms and seriousness of each individual disease should be obtained.

Perhaps out of this conference some ideas will arise which may simplify a very complex problem and ultimately lead to a more uniform system of potato certification."

in the absence of any other evidence, the fact that the defendant was found in possession of the same is sufficient to establish the fact that he was the owner of the same.

(1) The defendant is charged with the possession of the same at the time of the commission of the offense, and it is the duty of the jury to determine whether or not the defendant was in possession of the same at that time.

(2) It is the duty of the jury to determine whether or not the defendant was in possession of the same at the time of the commission of the offense, and it is the duty of the jury to determine whether or not the defendant was in possession of the same at that time.

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News notes, extension articles, or suggestions with regard to subjects that might be discussed profitably in this news sheet should be addressed to:

Fred C. Meier,
Extension Plant Pathologist,
Bureau of Plant Industry and Office of
Cooperative Extension Work, U. S. Department of Agriculture, Washington, D. C.

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